

WHAT IS CLAIMED IS:

1. An end-modified diene copolymer prepared from a conjugate diene polymer or a copolymer comprising at least one conjugate diene compound and a vinyl-substituted aromatic compound, the conjugate diene polymer or the copolymer being obtained by polymerization using an organic lithium initiator in the presence of a non-polar solvent, the end-modified diene copolymer being prepared by modifying the active end of the conjugate diene polymer or the copolymer with at least one polysiloxane compound represented by the following formula 1,

10 
$$Y-\{C(R^3)(R^4)\}_c-Si(R^1)(R^2)-\{O-Si(R^1)(R^3)\}_d-\{C(R^3)(R^4)\}_e-Y,$$

in which:

Y represents  $(X)_a(R)_bSi$ ,  $(X)_a(R)_bC$  or  $(X)_e(R^1)_fBZ-X$ ;

X represents a halogen atom selected from the group consisting of F, Cl, Br or I;

15 R represents a lower alkyl group containing 1 to 20 carbon atoms, including a methyl group, an ethyl group or a propyl group;

$R^1$ ,  $R^3$  and  $R^4$  are same or different from one another and are selected from a hydrogen atom, a lower alkyl group 1 to 20 carbon atoms, a halogen-substituted alkyl group, or a halogen-substituted silane group;

$R^2$  is the same as X or  $R^1$ , or represents  $(X)_g(R^3)_hC-\{C(R^3)(R^4)\}_{c-1}$ ;

20 a is 1 to 3;

b is 0 to 2, wherein  $a+b=3$ ;

c is 1 to 1,000;

d is 1 to 50,000;

e and f are independently 0 to 4, wherein  $e+f=4$ ;

g and h are independently 0 to 3, wherein g + h = 3; and

Bz-X represents benzyl halogen.

2. The end-modified diene copolymer as claimed in claim 1, wherein the  
5 organic lithium initiator comprises at least one selected from the group consisting of ethyl  
lithium, propyl lithium, n-butyl lithium, sec-butyl lithium, tert-butyl lithium, phenyl lithium  
and prophenyl lithium.

3. The end-modified diene copolymer as claimed in claim 1, wherein the  
10 compound represented by formula 1 is used in an amount of at least 0.01M with respect to  
1M of the organic lithium initiator.

4. The end-modified diene copolymer as claimed in claim 1, wherein the  
conjugate diene polymer, or the copolymer comprising at least one conjugate diene  
15 monomer and a vinyl-substituted aromatic monomer includes 10 to 100 wt% of the  
conjugate diene monomer and 0 to 90 wt% of the vinyl-substituted aromatic monomer.

5. The end-modified diene copolymer as claimed in claim 1, wherein the  
conjugate diene polymer or the conjugate diene copolymer has a weight average molecular  
20 weight in the range from 1,000 to 1,200,000.

6. The end-modified diene copolymer as claimed in claim 1, wherein the  
conjugate diene compound is selected from the group consisting of isoprene and 1,3-  
butadiene, the vinyl-substituted aromatic compound being selected from the group

consisting of styrene and alpha-methyl styrene.

7. The end-modified diene copolymer as claimed in claim 1, wherein the end-modified diene copolymer has a vinyl bond of butadiene being 10 to 70 %, a molecular weight distribution of 1.1 to 3, and a Mooney viscosity of 10 to 200.

8. A rubber composition for tire treads comprising 100 parts by weight of an ingredient rubber containing at least 10wt% of the end-modified diene copolymer according to claim 1, 10 to 100 parts by weight of an inorganic filler, 0.1 to 5 parts by weight of sulfur, and an vulcanization accelerator.

9. The rubber composition for tire treads as claimed in claim 8, wherein the inorganic filler includes silica or carbon black.